MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2019/2020

PBM0054 – MATHEMATICS

(Foundation in Business)

7 MARCH 2020
9.00 a.m. – 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of 2 pages with **FOUR** questions.
2. Attempt **ALL** four questions. The distribution of the marks for each question is given.
3. Please write all your answers in the answer booklet provided. All necessary workings **MUST** be shown.

QUESTION 1

a. Simplify: $\left(\frac{xz}{5y^4}\right)^{-2} \div \left(\frac{30x^3y^{-4}z^5}{6x^{-4}yz^7}\right)^3$. (6 marks)

b. Solve the inequality: $\frac{1}{5}\left|\frac{1}{6}-\frac{2}{3}x\right|+4<6$. (4 marks)

c. Solve: $\sqrt{6x+6}=5+\sqrt{21-4x}$. (9 marks)

d. Given the quadratic function $f(x)=3x^2-2x-4$.

i. Determine whether the parabola opens upward or opens downward.

ii. Find the vertex of the parabola.

iii. Find the x- intercepts of the parabola. Leave your answers in $\sqrt{\ }$ form.

(6 marks)

(Total: 25 marks)

QUESTION 2

a. i. Use properties of logarithms to write the expression as a single term:

$$\log 4x+\frac{1}{2}\log(3-4x)-3\log 2x-2\log(x-1)$$ (3 marks)

ii. Solve for x in the following equation:

$$250e^{0.05x+1}+175=1175$$ (4 marks)

iii. Solve the following equation:

$$\ln(x-3)=\ln(7x-23)-\ln(x+1)$$ (5 marks)

b. Solve the following system of linear equations using the inverse of coefficient matrix.

$$\begin{aligned} 2y+2z&=-5\\ -3x-4y-z&=3\\ 6x+2y+3z&=-5 \end{aligned}$$ (13 marks)

(Total: 25 marks)

Continued...

QUESTION 3

a. Find the $\frac{dy}{dx}$ for the given functions and simplify the answers.

i. $y = 3x^{10} + 7x^{-3} + \sqrt[7]{x^3} - 6x + 3$ (4 marks)

ii. $y = (4x+3)^2(5-2x)^3$ (6 marks)

iii. $y = \frac{(x^3-2x)^6}{(3x+1)^3}$ (7 marks)

b. Find the equation of the tangent line to the curve $y = \left(\frac{1+x^2}{1-x^2}\right)^3$ at $x = 2$. (8 marks)

(Total: 25 marks)

QUESTION 4

a. Integrate each of the following integral.

i. $\int 8 - 12x^{-5} - \frac{1}{\sqrt[5]{x^2}}\, dx$ (4 marks)

ii. $\int (x^2-2x)(x^3-3x^2+1)^4\, dx$ (6 marks)

iii. $\int_4^{25} \frac{x^{\frac{1}{2}}}{\sqrt[3]{x^{\frac{3}{2}}+1}}\, dx$ (7 marks)

b. Given $f(x) = \begin{cases} 4, & -2 < x < 1 \\ 3\sqrt{x} - x^3, & 1 < x < 2 \\ \frac{x^2-1}{x^2}, & x \geq 2 \end{cases}$. Find $\int_{-2}^{4} f(x)\, dx$. (8 marks)

(Total: 25 marks)

End of Paper